



## LANDFIRE Review & Feedback

### Meeting Notes & Documentation

2/2-3/11 Boise, ID – NIFC  
Sho-Pai bldg - Raleigh Atkins Conference Room

**Meeting Purpose and Questions:** Information from National efforts [Fire Program Analysis (FPA), Wildland Fire Decision Support System (WFDSS), Ecosystem Management Decision Support / Hazardous Fuel Prioritization Analysis System (EMDS / HFPAS), Fuels Management Committee (FMC), Geospatial Task Group (GTG).]

- How are the LANDFIRE data layers working?
- What data layers are being used, how are they being used?
- What elements of the LANDFIRE data products have worked well?
- What data layers are you not using? Why are they not being used?
- Areas of consistent problems or issues? Discuss the magnitude and implication of issues or problems with the data.
- Identify program data needs for the future (i.e. what data product or data enhancements would be beneficial to your or other program areas?)

**Meeting Objectives & Outcomes:**

1. Identify and document “specific” technical issues and system requirements.
  - A. Develop understanding of short-term improvements vs. long-term Research and Development needs.
2. Identify areas of future data needs, requirements, and possibilities.

**Participants:**

Nancy Lee Wilson, David Mueller, Jeff Eidenshink, Joe Kafka, Bill Yohn, Doug Havlina, Jim Menakis, Jeff Jones, Brent Timothy, Terri Knauth, Karen Short, Craig Thompson, Dennis Dupuis, Jeff Whitney, Matt Rollins, Don Ohlen, Don Long, Cameron Tongier, Frank Fay, Henry Bastian, Erik Christiansen, Russ Johnson, Susan Goodman, John Guthrie, Susan Stitt, Charley Martin, Tobin Smail, Jim Napoli, Jerry Szymaniak, Laurie Kurth, Brian Sorbel, Jan Passek, Marsha Henderson, Tonja Opperman, Kim Ernstrom, Krista Gollnick-Wade, Sean Triplett, Carsten Goff

**Notes and Documentation**

Meeting started with a review of the purposes & questions and objectives & outcomes. Matt Rollins did an overview of LANDFIRE 2001 National approaches for the major milestones (Western / Eastern / AK-HI). Henry Bastian gave a short summary on the Improvements project and LANDFIRE 2008 Refresh.

The notes from this meeting are listed below and contain a short summary of the topic area and key points that were presented. Participants in the meeting identified issues and requests as part of the presentations. This document lists the requested items and each item has a short response on how LANDFIRE is or will attempt to address the issue as part of the LANDFIRE 2008 Refresh update or as part of future updating. ***The LANDFIRE responses to the requests are italicized within this document.*** Some of the responses to the requested items address scope, schedule, and budget considerations which need to be evaluated by LANDFIRE oversight.

## **General comments from all presentations**

- A. Request to have a list of ancillary data documented on the landfire web site with instructions on how to request these ancillary data set that have been developed as part of the LANDFIRE production process.
- (A). LANDFIRE currently has this list of ancillary data information internal to the program. This list is not posted on the LANDFIRE web site ([www.landfire.gov](http://www.landfire.gov)). LANDFIRE will work on organizing this information so it can be posted on the web site. Data can currently be requested through the contact us link on the web site (<http://www.landfire.gov/contactus.php>)*
- B. Request that LANDFIRE put together a list of web site links of data that have been used in the process of developing LANDFIRE data products; i.e. National Boundary.
- (B). LANDFIRE currently does not have a complete list of other products with their associated web site links. LANDFIRE will work on developing and posting it on the landfire web site.*
- C. Request that greater data transparency is provided regarding the LANDFIRE Reference Data Base (LFRDB). Information needs to show data broken out by all federal data providers and as possible other significant contributors. Also, provide more information on when the data were requested, when data were received, where the data are in the update process, when will updated LANDFIRE data products be delivered based on data submissions (point and polygon data sets) and when will the LFRDB be posted and available for the latest LANDFIRE data call and update?
- (C). LANDFIRE currently has posted on the web site the LANDFIRE 2001 National (LF\_1.0.0) LFRDB ([http://www.landfire.gov/lfrdb\\_data.php](http://www.landfire.gov/lfrdb_data.php)). This database is principally point data and only contains data that had permission from the data contributors to share and post their data. Also, information from the LANDFIRE 2007 "Rapid Refresh" (LF\_1.0.1) data base, which is polygon data, is available currently for download at ([http://www.landfire.gov/updatedproducts\\_fireperimeter.php](http://www.landfire.gov/updatedproducts_fireperimeter.php)). By way of information, LANDFIRE is currently working on geographic area and Refresh LFRDB reports which will address LFRDB processing and production approaches. These reports will cover many of the types of questions that are listed above. These reports will be coming on-line through 2011. When LANDFIRE 2008 "Refresh" (LF\_1.1.0) is completed, the events database will be posted on the [landfire.gov](http://www.landfire.gov) website where data can be accessed, queried, and downloaded. The data from LANDFIRE 2008 Refresh (LF\_1.1.0) will principally contain polygon data.*
- D. Request to have links to data of the raw LandSat satellite imagery available for download to overlay and compare and contrast with LANDFIRE data products.
- (D). LANDFIRE will evaluate this request further on how this compare and contrast exercise would be used by users interested in this type of data. LandSat data are currently free and available at (<http://glovis.usgs.gov/>).*
- E. Request to review the rule sets that are being used in the development of the Fire Behavior Fuel Models (FBFM) in particular the non-burnable areas. Also a review of the Protected Area Database (PAD) that LANDFIRE used to delineate federal and non-federal areas where non-burnable fuels are less likely to be present.

*(E). LANDFIRE is in the process, as part of updating the data in LANDFIRE 2008 “Refresh” (LF\_1.1.0), to develop reports for each of the geographic area production areas. In these reports, the methods to develop the FBFMs will be presented. The tool that is used as part of the production process of developing the data – The LANDFIRE Total Fuel Change Tool (LFTFCT) is being developed so it can be accessed and downloaded along with a user guide through the National Interagency Fuels, Fire, and Vegetation Technology Transfer team (NIFTT). With this tool, users will be able to evaluate the rule sets that were used in developing the FBFMs.*

*The PAD will be listed as one of the ancillary data sets listed in request “B” from above.*

- F. Request to have LANDFIRE coordinate with NFPORS, WFDSS, FACTS, and other data bases to gather geo-spatial data / polygon perimeters so that data within these programs/systems can be fed back into LANDFIRE to assist in reducing the impact of the LANDFIRE data call on the field.

*(F). LANDFIRE currently is using FACTS data as part of LANDFIRE 2008 “Refresh” (LF\_1.1.0) and to the extent available NFPORS data. The requirement to include polygon / perimeter data in NFPORS has only been optional and not required so the amount data has been limited. LANDFIRE has been in conceptual discussions with WFDSS where perimeters could be potentially be used in future LANDFIRE updates. LANDFIRE is in the process of continued work and collaboration with each of these and other program areas to develop this type of feedback loop.*

- G. Request for LANDFIRE to coordinate schedules across as many program areas as possible – FPA, WFDSS, HFPAS, etc.

*(G). LANDFIRE has coordinated schedules with FPA to facilitate FPA analyses. The current work and staggered delivery of LANDFIRE 2008 “Refresh” (LF\_1.1.0) “Group A” data products is part of this coordination. Also, to the extent possible data are being updated and provided to WFDSS for as much of the country as possible in advance of the typical wildland fire seasons. Limited coordination on delivery of LANDFIRE data products for the HFPAS process has occurred in the past.*

- H. It would be helpful to do some large investigations of areas across the country (may need some specific examples from field areas) where cross validation between data layers would be valuable.

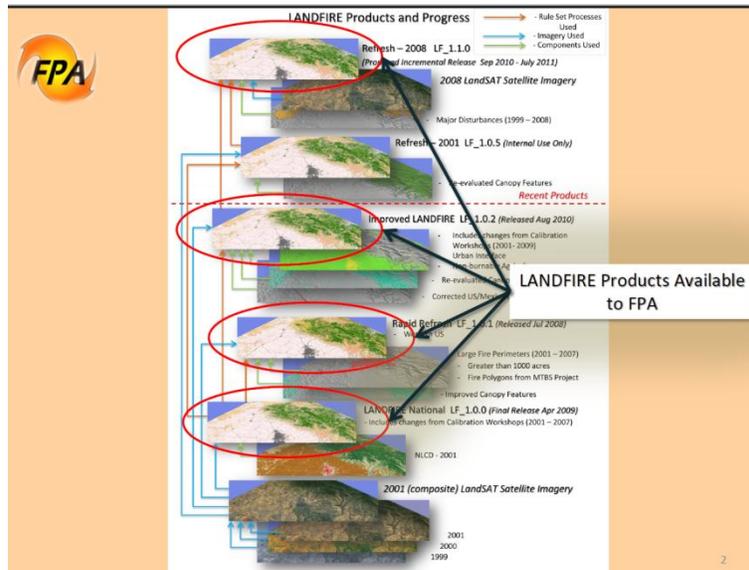
*(H). LANDFIRE would encourage and welcome these types of investigations. If there is interest from user groups or portions of the country willing to collaborate on this please contact LANDFIRE at (<http://www.landfire.gov/contactus.php>) These types of efforts may be accommodated with potential future calibration workshops, data reviews, and through data input that would be provided from the field/regions for the next LANDFIRE update. LANDFIRE 2010 (LF\_1.2.0).*

- I. Request LANDFIRE to conduct future calibration workshops paying particular attention to edge matching among map zones and geographic area boundaries for vegetation types and fire behavior fuel models that cross these boarders.

*(I). LANDFIRE is considering conducting future workshops. LANDFIRE has been discussing this idea and concept on its monthly user conference calls. If conducted, these workshops may be done on a geographic area basis which would facilitate review between map zone boundaries. As more information on this develops LANDFIRE will work to inform users on this topic.*

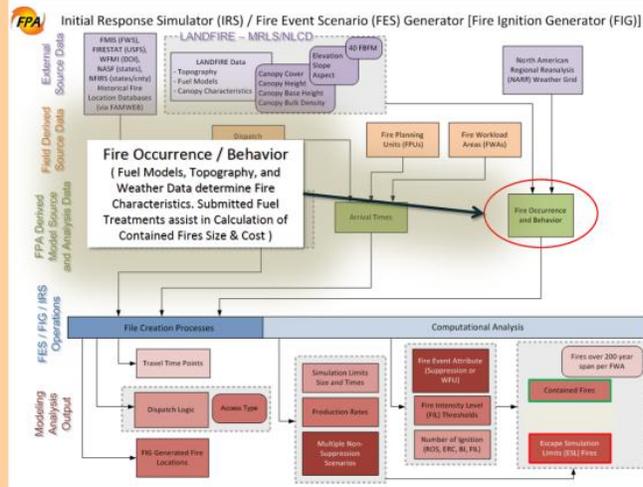
# Fire Program Analysis (FPA) use of LANDFIRE

Craig Thompson, Terri Knauth, Karen Short, and Brent Timothy. FPA highlighted LANDFIRE data use in the Initial Response Simulator (IRS), Fire SIMulation system (FSIM), and Large Fire Statistical Model along with listing some future data needs.

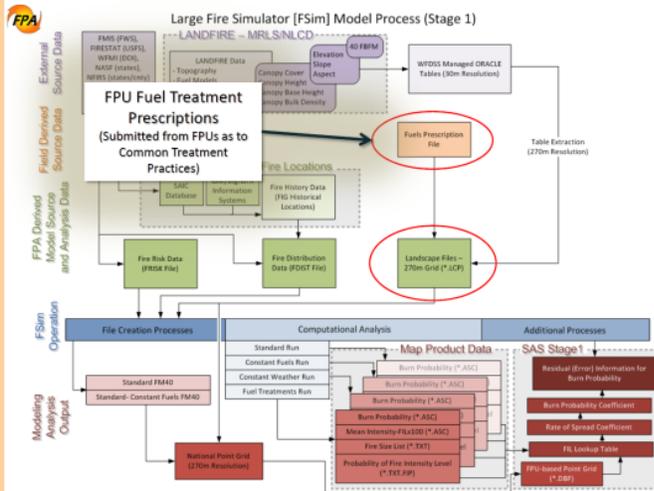


(Figure 1.) FPA view of available LANDFIRE data products for use within FPA.

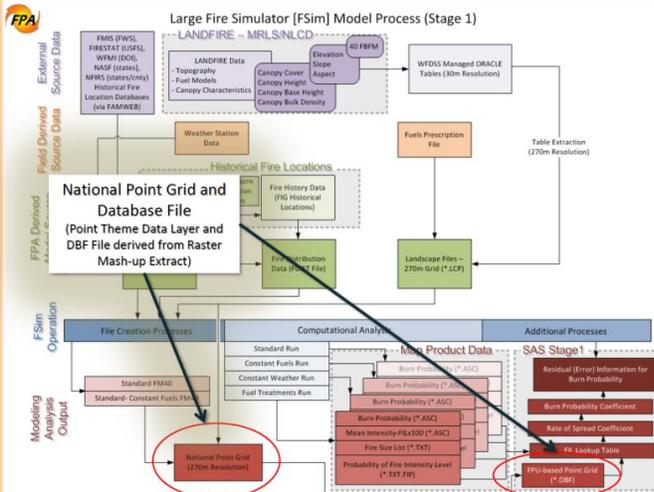
## How LANDFIRE data are used in Fire Program Analysis



(Figure 2). Use of LANDFIRE data products in FPA within the Initial Response Simulator (IRS)



(Figure 3). Use of LANDFIRE data products in FPA within the Large Fire Simulator (FSim) stage 1 of the model process assessing fuel treatment prescriptions.



(Figure 4). Use of LANDFIRE data products in FPA within the Large Fire Simulator (FSim) stage 2 with the statistical model to determine the affects of treatments and average fire costs.



## LANDFIRE Data

### FPA Future Needs / Desires

- Desire a possible Method of receiving the LANDFIRE Change Matrix in an FPA-compatible Format
- Availability of Data Layers used in the various Improvements to LANDFIRE Versions (Disturbances, AOIs)
- Is there a Data Layer that can be used as a “Level of Acceptable Change” (LAC) Indicator?
- Possible relationships between EVT and PNV Data Layers (describes gap between values - Environmental Gradients - BpS)?
- What Successional Stage Data Layers are available (describe Pathways and Frequencies)?
- Quality Control from SMEs of all Wildfire Fighting Agencies per Map Zone? (Scrutiny at Unit Level)
- Coverage of Puerto Rico, American Samoa, and Guam

(Figure 5). List of FPA future needs / desires from LANDFIRE.

- J. Desire a possible method to receive from LANDFIRE the vegetation change matrix being developed as part of LF 2008 Refresh (LF\_1.1.0) in an FPA-compatible format. To coordinate with FPA on Vegetation Dynamics Development Tool (VDDT) & Forest Vegetation Simulator (FVS) on FPA post treatments and vegetation transitions. Possibly provide simplified change matrix values and assistance within FPA on FBFM assignments.
- (J). LANDFIRE will work with FPA to coordinate this request as time permits through the production and data delivery schedule constraints of both FPA and LANDFIRE.*
- K. Request that LANDFIRE deliver data products to include the data layers used in various improvements to the LANDFIRE versions (disturbances, areas of interest). Is there a data layer within LANDFIRE that can be used as a “Level of Acceptable Change” (LAC) indicator?
- (K). LANDFIRE is currently developing and processing data as part of LANDFIRE 2008 “Refresh” (LF\_1.1.0) which includes Vegetation Change Tracker (VCT) data, Remote Sensed Landscape Change (RSLC) data, Monitoring Trends in Burn Severity (MTBS) data, and information provided from users (field, regional, or national data). These data are compiled into a change layer which will be addressed in the geographic area reports and provided as downloadable information both in tabular form as well as in GIS form where the data contributors have given permission.*
- L. Evaluation of possible relationships between Existing Vegetation Type (EVT) and Potential Natural Vegetation (PNV) or Biophysical Settings (BpS) / Environmental Site Potential (ESP) – Describe gaps between values and environmental gradients?  
What successional stage data layers are available? (describe pathways and frequencies).
- (L). There are two aspects to consider here. First, some explanation of the relationships between LANDFIRE EVT, ESP, and BpS is probably in order. To some degree, the White Paper on LANDFIRE vegetation mapping classification units using Ecological Systems may help facilitate this discussion. This paper can be requested through LANDFIRE. Another, more complete white paper could be developed that includes a thorough discussion of the LANDFIRE National rectification process. The rectification process directly addressed relationships between EVT and ESP and BpS and EVT respectively. LANDFIRE 2001 National conducted a rectification process as part of the mapping procedures. The differences or data gaps a part of an issue of incrementally*

delivering the data products as the ability to address issues is limited because products have been released and the production team has not had the time to revisit data products and compare and contrast them among the other data layers. It is important to note, that LANDFIRE is working on aligning data products with the Federal Geographic Data Committee (FGDC) National Vegetation Classification Standard (NVCS). Using this standard may address many of these relationship differences.

Second, a succession class layer, called SClass, is available in the LANDFIRE data suite. The Sclass layer depicts vegetation states within the context of a BpS.

- M. Request for LANDFIRE to organize a pool of Subject Matter Experts (SMEs) per geo-area or geographic regions of the country of all wildland fire fighting agencies to serve as an advisory group reviewing Fire Behavior Fuel Models (FBFM) providing scrutiny at the unit level and increased quality control.

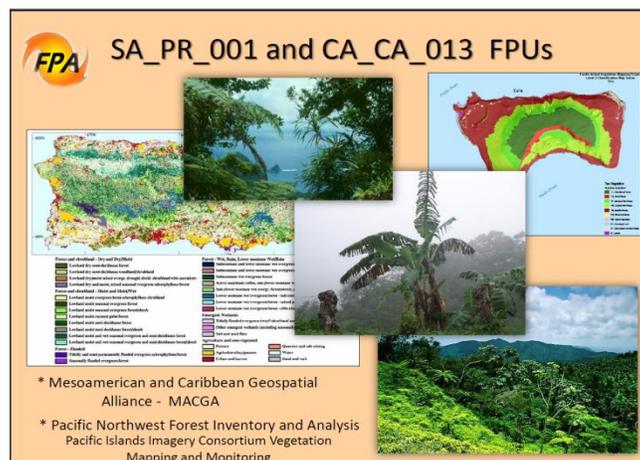
(M). LANDFIRE has used SMEs in the refinement of LANDFIRE 2001“National” (LF\_1.0.0) data products through both limited vegetation review in the development of the vegetation data products and moderate review and input through the FBFM calibration workshops. As addressed in response “I”, LANDFIRE is evaluating doing calibration workshops for LANDFIRE 2008 “Refresh” (LF\_1.1.0) which will leverage SMEs in the review of these data products. LANDFIRE is also open to considering other avenues or methods for engaging SMEs in a facilitated review process.

- N. Request for LANDFIRE to develop a Google map interface with LF data products.

(N). LANDFIRE will explore this for the future considering scope, schedule, and cost aspects and is interested in coordinating with other groups on this technology, specifications, and future maintenance requirements. As more information on this develops LANDFIRE will work to inform users on this topic.

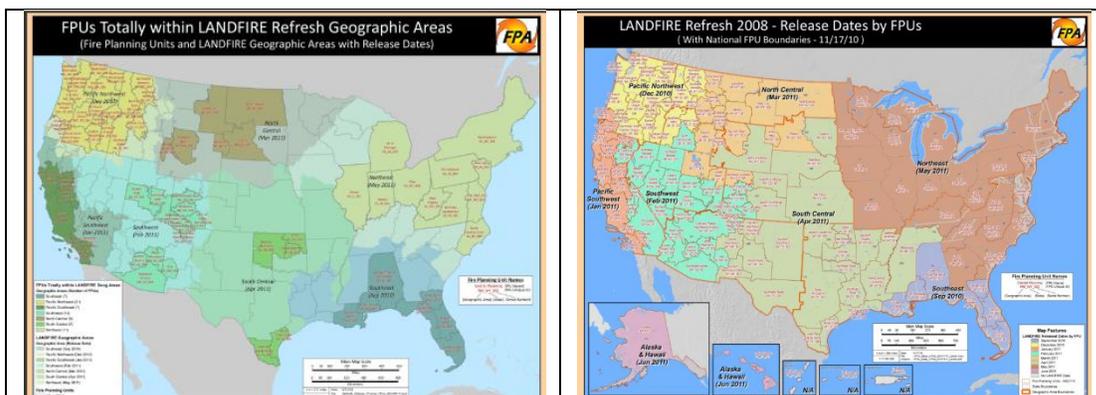
- O. Request that LANDFIRE produce and deliver data products for the islands and territories (Coverage of Puerto Rico, America Samoa, Guam, Mesoamerican & Caribbean Geospatial Alliance (MACGA)).

(O). LANDFIRE has already begun exploring the possibility of inclusion of these areas. More on the possibility of developing and delivering these areas will be put together in a report documenting the scope, schedule, and estimated costs for inclusion. As more information on this develops LANDFIRE will work to inform users on this topic.



(Figure 6). Graphic from FPA on request of data products for the islands and territories.

- P. Request for LANDFIRE to re-sample and provide data at the 270m level for all LF data layers. Specifically for FPA but more broadly for multiple uses and applications where data are consistently packaged at this scale.
- (P). LANDFIRE will evaluate this request considering scope, schedule, and cost aspects along with future maintenance needs of providing this service. LANDFIRE is interested in coordinating with users on the requirements of this request. We will look into the potential of providing a link on the LANDFIRE website to these resampled data sets or work with FPA and WFSS on ways to share this effort. As more information on this develops LANDFIRE will work to inform users on this topic.*
- Q. Request for LANDFIRE to provide spatially explicit disturbances (wildland fires, vegetation management, etc)
- (Q). As stated in response K, LANDFIRE is currently developing and processing data as part of LANDFIRE 2008 “Refresh” (LF\_1.1.0) which includes Vegetation Change Tracker (VCT), Remote Sensed Landscape Change (RSLC), Monitoring Trends in Burn Severity (MTBS), and data provided from users (field, regional, or national data). These data are compiled into a change layer which will be addressed in the geographic area reports and as listed in response C, information from the LANDFIRE 2007 “Rapid Refresh” (LF\_1.0.1) data base, which is polygon data, is available currently for download at ([http://www.landfire.gov/updatedproducts\\_fireperimeter.php](http://www.landfire.gov/updatedproducts_fireperimeter.php)) and as the data from LANDFIRE 2008 “Refresh” (LF\_1.1.0) are completed the data compiled as part of the LANDFIRE Events database will likewise be posted for access and download for the user community.*
- R. Request for LANDFIRE to deliver data by Fire Program Analysis – Fire Planning Units (FPUs).
- (R). The processes LANDFIRE uses to develop the data products are based on ecological and biological parameters and not on political or administratively determined boundaries. The issues that have been identified of seamlines and/or differences between map zones may be magnified as data development and production would be potentially structured around 150+ FPUs. However, there may be a way to organize map zones that would more closely align with FPUs to facilitate FPA production and assessments.*



(Figure 7). Graphics from FPA showing overlap of FPA Fire Planning Units (FPUs) and LANDFIRE 2008 “Refresh” (LF\_1.1.0) geographic areas.

# **HFPAS & EMDS use and results of LANDFIRE**

Russ Johnson / Susan Goodman, Jim Menakis, Krista Gollnick-Wade, Jerry Szymaniak, and Bill Yohn,

Fuels Management Committee – Dennis Dupis / Dave Mueller

Ecosystem Management Decision Support (EMDS): A framework designed to conduct environmental assessments. HFPAS uses this framework to evaluate high priority areas relative to risk from wildfire and associated negative consequences. EMDS/HFPAS uses nationally consistent, best available geospatial data including LANDFIRE data.

## Data used includes:

Existing Vegetation Type (EVT)

- Used EVT life form in the Ecosystem Vulnerability matrix
- Used EVT “Introduced” (EVT\_NAME) in the non-native layer.

40 Scott and Burgan Fire Behavior Fuel Models (FBFM 40)

- Used to categorize WUI using the surface fire potential categories

Fire Regime Groups (FRG)

Fire Regime Condition Class (FRCC)

Succession Classes (S-Class)

## Weaknesses of LANDFIRE data

- S. Vertical Integration of LANDFIRE data layers (ensure that “not rated/non-burnable” areas are classified consistently across all layers. [Some areas show no dominant life form, water & shrub issues, Bps and EVT in some areas to not line up – both in west and east].

*(S). LANDFIRE will evaluate this to the extent possible but it would be extremely helpful to have examples / locations provided where this type of issue has been observed. As these examples are located, the best way to provide this feedback would be through the contact us link at [landfire.gov](http://landfire.gov) so this information can be catalogued.*

- T. Edge match issues between LANDFIRE map zones [Some Existing Vegetation Type (EVT) differences in places such as; Southern Nevada & Northern Arizona, California. Also some difference in FRCC ratings between mapping zones].

*(T). Many LANDFIRE data themes (e.g., EVT, EVC, EVH, FBFM, FRCC) were processed, Map Zone by Map Zone. That is, adjacent Map Zones were processed independently from each other. Consequently, Map Zone “footprints” are evident in some data themes. For example, an EVT would not be mapped in a Map Zone, unless training plots for that EVT actually exist within the Map Zone. Thus, an EVT may be mapped in one Map Zone, but not in an adjacent Map Zone that lacked the training plots. Thus, it is critically important that users provide specific examples to us through the “Contact us” link at [landfire.gov](http://landfire.gov) and as part of the data submissions when requested.*

*Map Zone footprints evident in FRCC products (e.g., FRG, Departure, and FRCC) are due to several causes. First, many products were derived using LANDSUM which was processed Map Zone by Map Zone. Second, BpS models are unique to each Map Zone. Since BpS is a strata then used to derive FRCC metrics, it shouldn't be surprising that differences are evident across Map Zone boundaries. LANDFIRE 2008 Refresh (LF\_1.1.0)*

*will resolve FRCC-related Map Zone differences by: (1) grouping like BpSs together (thereby eliminating Map Zone uniqueness); (2) deriving FRCC by groups of Sub-basins instead of by Map Zone (however, this will likely result in footprints along boundaries of Sub-basin groups); and (3) deriving fire regime attributes directly from the grouped BpS model instead of LANDSUM process which was used in developing LANDFIRE 2001 National (LF\_1.0.0) data products.*

- U. Rules sets need to be documented and better defined (in particular in the Mojave and Sonoran deserts). [It would be helpful to have a flowchart of rule sets such as exotics present and FRCC mapping calls as mentioned in the desert systems. FRCC in drier climates are misclassified and there are issues between map zone boundaries. What data were used and how was it summarized?]

*(U). LANDFIRE will evaluate why FRCC seems to be misclassified in desert environments. LANDFIRE 2008 Refresh (LF\_1.1.0) is remapping BpSs in grassland and shrubland settings using SUURGO soils data which may help with this situation. However, at this time, under-estimating departure and FRCC in these environments is most likely attributable to our inability to effectively map exotics due in part, by the paucity of plot data that quantifies canopy cover of exotic plant species. LANDFIRE will evaluate techniques to better identify infestations of exotic plants across landscapes for product versions following LANDFIRE 2008 Refresh (LF\_1.1.0). For example, original data processing assumed that exotics must comprise some minimal threshold of the total vegetation cover before a Sclass would be assigned to exotic species code "UE". Perhaps this threshold needs to be re-evaluated.*

*As mentioned above in response "T", Map Zone footprints evident in FRCC products (e.g., FRG, Departure, and FRCC) are due to several causes. First, many products were derived using LANDSUM which was processed Map Zone by Map Zone. Second, BpS models are unique to each Map Zone. Since BpS is a strata then used to derive FRCC metrics, it shouldn't be surprising that differences are evident across Map Zone boundaries. LANDFIRE 2008 Refresh (LF\_1.1.0) will resolve FRCC-related Map Zone differences by: (1) grouping like BpSs together (thereby eliminating Map Zone uniqueness); (2) deriving FRCC by groups of Sub-basins instead of by Map Zone (however, this will likely result in footprints along boundaries of Sub-basin groups); and (3) deriving fire regime attributes directly from the grouped BpS model instead of LANDSUM.*

- V. In Fire Regimes, the indeterminate fire regime characteristics need to be reevaluated.
  - (V). Historical fire regimes will be mapped directly from the BpS layer, using the associated fire regimes characteristics from the BpS model.*
- W. Request that LANDFIRE assess the Existing Vegetation Type mapped data as there are some vegetation types that are underrepresented such a Pinyon/Juniper – dry forests, Mesquite classified as trees instead of shrub along with differences in Mahogany as trees/shrubs showing as non-forest types.
  - (W). LANDFIRE will evaluate this to the extent possible but it would be extremely helpful to have examples with specific locations provided where this type of issue has been observed. As these examples are located, the best way to provide this feedback would be through the contact us link at [landfire.gov](http://landfire.gov) so this information can be catalogued.*
- X. Request LANDFIRE to evaluate Fire Behavior Fuel Models (FBFM) and vegetation types where they appear to be oversimplified. Examples of this include Pinyon / Juniper vegetation types as TL3 along with oak woodlands.

*(X). LANDFIRE is producing data products based on the available and submitted plot data. Additional field points and polygon data for these types would improve the classification and mapping. LANDFIRE uses data from the LFRDB in a sequence table process to characterize species to define vegetation as grass, shrub, or forest types. Furthermore, forested types must have a minimum 10% cover to be classified as a forest. More imagery beyond the typical leaf on, leaf off may be helpful. This is something that LANDFIRE will explore through further research and development in the out years.*

## **HFPAS & EMDS continued:**

### Strengths of LANDFIRE data

- Nationally consistent wall-to-wall cross-boundary data
- Designed for landscape-scale analysis
- LANDFIRE provided CONUS mosaic product to HFPAS process
- Not a static product
- LANDFIRE at 30 meter resolution is suitable for inspection by the field. (As opposed to a coarser more generalized resolution.)

### LANDFIRE layers considered but not used

Note: EMDS/HFPAS team has not had the time too fully or adequately assess these data layers for inclusion in the EMDS/HFPAS process.

- Forest Canopy Cover
- Forest Canopy Bulk Density
- Forest Canopy Height
- Forest Canopy Base Height
- Biophysical Settings

### EMDS/HFPAS Suggested Solutions

All LANDFIRE layers need edge matching between adjacent maps zones. (BPS, EVT, FBFM 40, and FRCC are in particular need of this) There probably is a need for cross-regional workshops to work out the edge matching issue.

All layers should be vertically integrated (e.g. ensure “not rated/non-burnable” areas are classified consistently across all vegetation/fuel layers.)

Refine LANDFIRE rule sets and publish these rules. In particular, in low precipitation map zones. (e.g. FRG and FRCC are often wrong in the desert, western shrub, ponderosa pine, and PJ areas.)

Improve layers that identify crown characteristics

Easier crosswalks in the LANDFIRE layer attribute tables (e.g. NB1, NB8, and NB9 are labeled the same in all documentation).

Use soils to identify and improve BPS and EVT, particularly in non-forested types.

Base FBFM, Succession Class, FRG and FRCC off of the BPS layer. Currently, many layers are based off EVT rather than the BPS layer.

Continue conducting regional "calibration workshops" not only for FBFM layer but also for BPS, EVT, FRG and FRCC layers.

Fund national vegetation and fuel survey effort to 'validate' fuels and vegetation characteristics. Sponsor a national effort to sample fuel/vegetation at least one LANDFIRE zone per geographic area. Make data available to field offices.

Suggested additions to the LANDFIRE dataset

Wildland Urban Interface dataset

National Wildfire Risk Assessment dataset

Formally requested derived or integrated LANDFIRE datasets such as 270m re-sampled fuels or ecosystem vulnerability datasets

- Y. Request for LANDFIRE to develop a true dominant cover type map serving more attributes along the lines of cover, type, NLCD, SAF, SRM, etc.

*(Y). LANDFIRE is in the process of working and supporting the development of the National Vegetation Classification Standard (NVCS) as approved by the Federal Geographic Data Committee (FGDC). This new standard will enable LANDFIRE to go beyond the Ecological Systems vegetation mapping classification used in developing LANDFIRE 2001 National (LF\_1.0.0) data products. The coordinated work on NVCS will assist in providing data products in a format to facilitate this type of work. Please note, that LANDFIRE is currently delivering data attributed by SAF – Society of American Forest and SRM – Society of Range Management vegetation types through a crosswalk approach from Ecological Systems.*

- Z. Request for LANDFIRE to have BpS play a larger role vs. EVT in determining Fire Regime Groups documenting the methods and approach to develop these data.

*(Z). The LANDFIRE 2008 Refresh depiction of Fire Regime Groups will be derived exclusively from BpS; EVT will have no role in deriving Fire Regime Group.*

- AA. Request for LANDFIRE to develop a process where pseudo plots can be developed through a consistent sampling process by subject matter experts using Google/NAIP imagery or other fine scale imagery for areas of concern.

*(AA). LANDFIRE will evaluate this request considering scope, schedule, and cost aspects along with potential need for research and development to structure a process like this. As more information on this develops LANDFIRE will work to inform users on this topic.*

- BB. Request for LANDFIRE to address labeling alignment across data layers (vegetation, fire behavior, etc.) regarding attributes such as (NB1, NB8).

*(BB). LANDFIRE strives for standardization across our many various data layers. Because of schedule and delivery on an incremental basis the ability of evaluating layer alignment has been difficult. Establishing a level of standardization within attribute labeling across these different data sets is a priority and plans to address this are being developed and assessed to determine how to proceed considering scope, schedule, costs, and users requirements.*

- CC. Request for LANDFIRE to develop and deliver as part of the LANDFIRE dataset a National Wildland Urban Interface layer.

*(CC). This is something that has periodically been presented to LANDFIRE in the past but has not been supported by LANDFIRE Oversight (Executive Oversight Committee). The rationale for this was that LANDFIRE had to be cautious in its scope and not take on other aspects or data products that may result in a failure to produce and deliver the core chartered*

*deliverables. However, under the operations and maintenance aspects of the Program, this is something that can be revisited as LANDFIRE is re-chartered and executive oversight re-constituted. As a result of the LANDFIRE Leadership Futures Forum, and the discussion of a National Landscape Conservation Information Framework this type of layer may be better suited under a human infrastructure data section.*

DD. Request for LANDFIRE to develop and deliver as part of the LANDFIRE dataset a National Wildfire Risk Assessment dataset.

*(DD). This is an area where LANDFIRE definitely has a role, however, the development and coordination of a National Wildland Fire Risk Assessment is currently beyond the scope of the Program. This would require executive direction and coordination across multiple datasets and data layers. LANDFIRE Program management would be willing to work with a group on coordinating this through direction of executive leadership.*

EE. Formally request derived or integrated LANDFIRE datasets such as 270m re-sampled fuels or ecosystem vulnerability datasets.

*(EE). Similar to the response in (P) there are significant advantages to having one consistent process and procedures that produce a resample data set for use by multiple users instead of various users having to process the same data set for each individual application. FPA and WFDSS are already doing this. We will look into the potential of providing a link on the LANDFIRE website to these resample data sets or work with FPA and WFDSS on ways to share this effort. As more information on this develops LANDFIRE will work to inform users on this topic.*

## **WFDSS use and results of LANDFIRE in AK**

Laurie Kurth, Marsha Henderson, and Brian Sorbel

### **AK LANDFIRE – General Impressions**

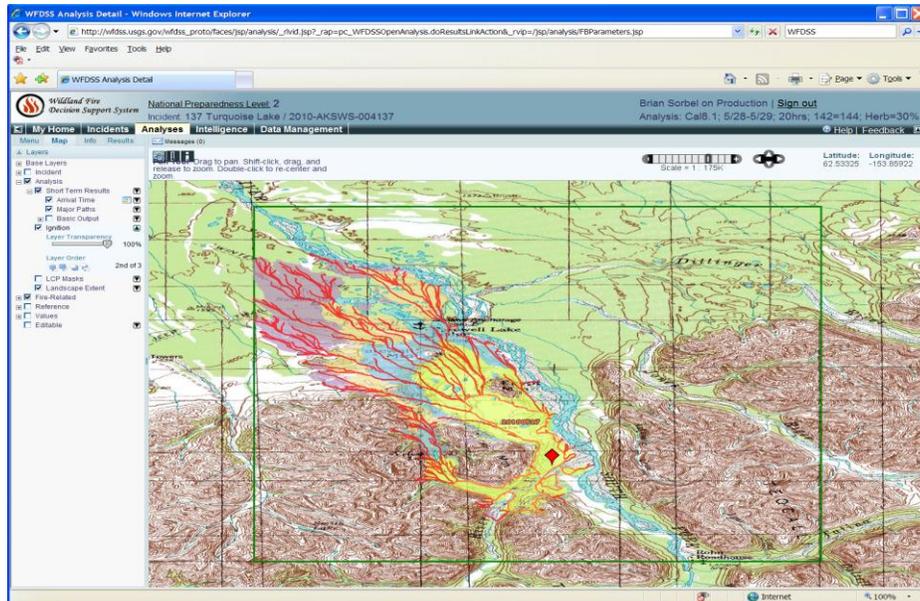
- There are known issues with the EVT layer
- Overall, glad to have the data...
- The data is far from perfect, but it's definitely not junk.
- Based on limited exposure, for geospatial fire behavior modeling, the AK Landfire data is a good place to start.
- Under-prediction of fire spread in FSPro appears to be an issue

NOTE: Observations are based on 2010 fire season, early start and very active fires. This season followed the late July and August active fires of 2009.

Recent fires are likely on landscape so edits are required (See figure 8 of current fire surrounded by historic fires from WFDSS)



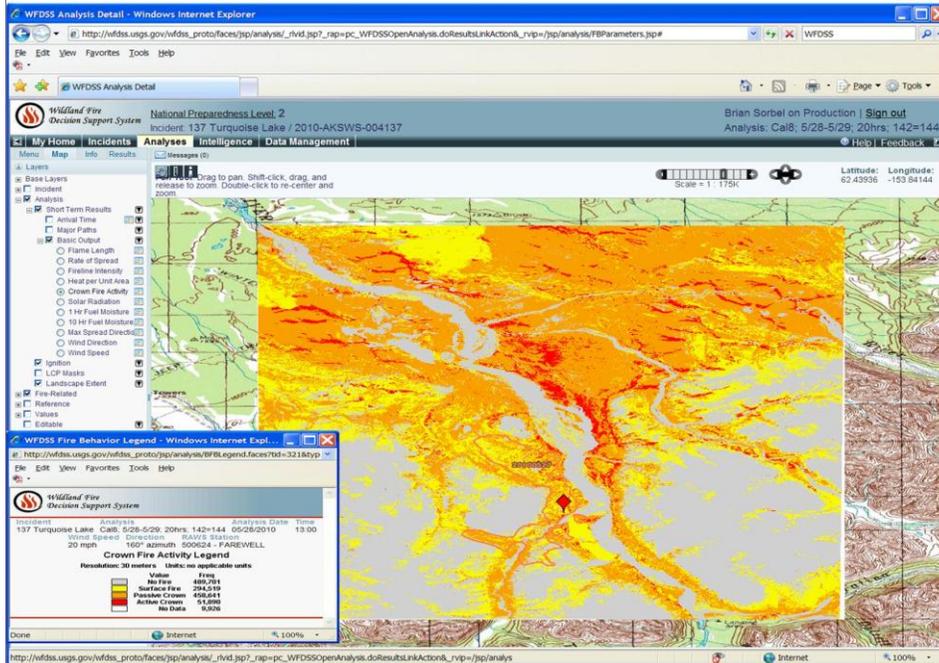
Alaska LANDFIRE data used in the 2010 Turquoise Lake Fire. Fire Behavior Fuel Model SH2 was changed to SH4 to reflect a local fire behavior effect. As demonstrated in figure 9 above the LANDFIRE data using the Finney crown fire attributes to model the fire does not calibrate well with observed fire spread over a 2-day period.



(Figure 10). 2010 Turquoise Lake Fire – Analysis using Scott/Reinhardt Crown Fire attributes (2001)

Alaska LANDFIRE data used in the 2010 Turquoise Lake Fire. Fire Behavior Fuel Model SH2 was changed to SH4 to reflect a local fire behavior effect. As demonstrated in figure 10 above, the LANDFIRE data using Scott/Reinhardt crown fire attributes to model the fire calibrates very well with observed fire spread over a 2-day period. No changes were made to .lcp aside Fire Behavior Fuel Model from SH2 to SH4.

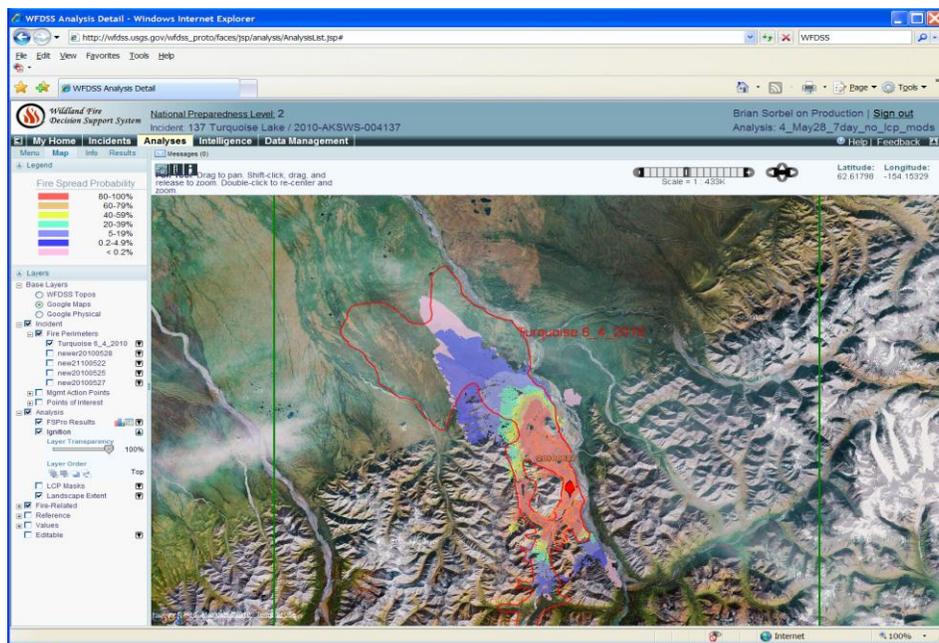
When comparing the examples from figure 10 and 11 using the Finney vs. the Scott/Reinhardt crown fire attributes it raises the question of, Why the difference? The answer as assessed in figure 11 below shows there is so much passive crown fire. Canopy Base Height values are rightly set very low in Alaska LANDFIRE data. Passive crown fire is almost always occurring. With Finney crown fire, only the surface Rate of Spread (ROS) is used in passive crown fire conditions. With Scott/Reinhardt crown fire, ROS is scaled up based on crown fraction burned.



(Figure 11). 2010 Turquoise Lake Fire – Crown Fire Activity

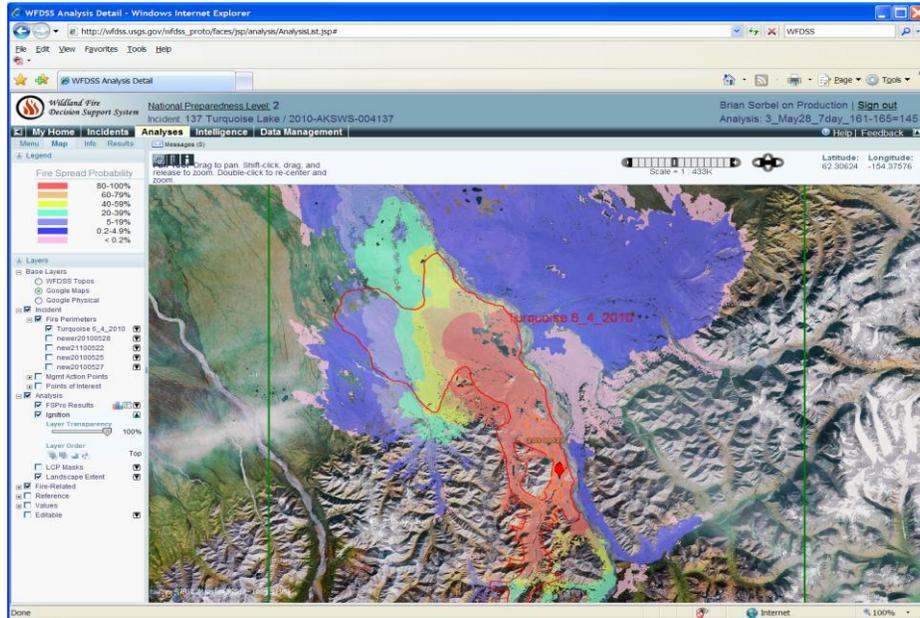
Landscape Edits for use with Finney Crown Fire in Fire Spread Probability (FSPro) / Short-Term Fire Behavior (STFB)

- Change TU4 to SH5 (optional: change all TU models to SH5)
- Multiply Canopy Base Height by 0.6
- For Timber fuel models, set Canopy Bulk Density to 0.3 kg/m<sup>3</sup>
- If percent canopy cover is between 25% and 45%, multiply by 0.85
- If percent canopy cover is greater than 46%, multiply by 0.7



(Figure 12). 2010 Turquoise Lake Fire – Fire Spread Probability (FSPro) assessment

In figure 12 with no edits to AK LANDFIRE data products, the FSPro run did not adequately reflect fire spread probability over a 7 day period.



(Figure 13). 2010 Turquoise Lake Fire – Fire Spread Probability (FSPro) assessment

In figure 13 with edits to AK LANDFIRE data products of converting the TU fuel models to SH5 a more credible FSPro run was produced reflecting fire spread probability over a 7 day period.

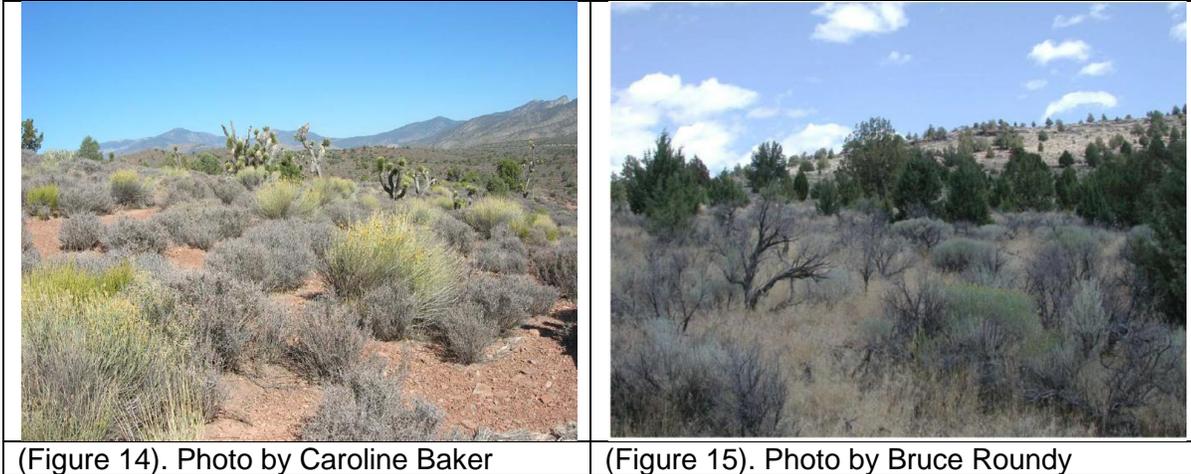
### Two Fuel Model Concept

- Case by case
- Season by season
- Adjust for actual fuels
- Adjust for fire behavior models

Black Spruce in Alaska – fuel model switch or crown fire behavior model switch, soil moisture, foliar moisture content?

Peat soils in the Southeast – water table level

Cheat grass in the Southwest (Spring Mountain example) Dry winter/wet winter definite fuel model switch



(Figure 14). Photo by Caroline Baker

(Figure 15). Photo by Bruce Roundy

FF. Request for LANDFIRE to explore and potentially develop two Fire Behavior Fuel Models for unique vegetation types. Types of things to consider include Dry vs. Wet winter fuel models developing an average and higher FBFM for each vegetation type.

*(FF). LANDFIRE is supportive of working with wildland fire management and science leadership to explore multiple – seasonal fire behavior fuel models. As a program, LANDFIRE works to maintain the scope of work based on direction from program oversight. However, LANDFIRE is willing to coordinate with other programs or groups to develop this into a recommendation that could be presented to executive leadership for consideration.*

GG. Request for LANDFIRE to review relationships between data layers particularly for the Existing Vegetation Type and Fire Behavior Fuel Model data layers.

*(GG). As LANDFIRE has been developing and producing the suite of data products, items such as this are placed on an internal program tracking list as well as through documentation of items submitted through the helpdesk. This item will be placed on that list and steps taken to evaluate these relationships further.*

HH. Request for LANDFIRE to update the data layers due to the recent fires.

*(HH). Updating data layers to include recent fires is Standard Operating Procedure (SOP) for LANDFIRE as part of the operations and maintenance of the program. However, LANDFIRE's procedures are such that the most recent version will always be about two years behind current conditions based on current infrastructure and technology today. E.g. LANDFIRE 2008 Refresh – (LF\_1.10) will represent 2008 conditions delivering vegetation and fire behavior fuel models in May 2011. The next update, LANDFIRE 2010, (LF\_1.2.0) will represent 2010 conditions delivered in the spring of 2013 unless a change in direction to the program occurs as mentioned in requests (NN) and (OO).*

II. Request for LANDFIRE to review the data where there are apparently data holes in the data with -1 values in the Aspect and Digital Elevation Model (DEM) data layers.

*(II). LANDFIRE has, and will continue to evaluate the extent of this reported issue. The DEM data layers provided by LANDFIRE through the Data Distribution Site (DSS) are a snapshot of the National Elevation Dataset (NED) available at the time of LANDFIRE data set development to provide for consistency between layers.*

*After doing a preliminary review, it was determined that some minor data holes did exist within the DEM data used at the time of LANDFIRE 2001 National mapping. NED data continues to be revised to reflect the latest developments from that program area and the most current NED data is available through the National Elevation Dataset web site.*

JJ. Request for LANDFIRE to review data that is problematic in riparian areas with FBFM calls of 182 vs. 189.

*(JJ). This issue illustrates the “two fuel model” concept quite well as also discussed in (FF). Under “normal” fire conditions, the fuels model assignment for riparian zones is often a slower moving FBFM model and generally impedes fire spread. However, in extremely dry conditions, as existed in the 2010 Alaska fire season, even these areas had experienced enough drying to burn quite readily so our initial fuel model assignment under-predicted spread rate. If we were able to produce two fuel model layers, one for more normal conditions, and one for extreme conditions, where more fuel is available to burn, we could have potentially mitigated or reduced this type of problem.*

KK. Request for LANDFIRE to review data on the North Slope of AK where timber apparently is showing up. The degree and extent of this needs further assessment as it has not been fully evaluated.

*(KK). LANDFIRE will evaluate the extent of this reported issue. An initial review and search on timber classes within the North Slope did not confirm this as an issue. However, the issue has been noted and entered for corrective action processes if upon a more extensive review or if further reports identify specific locations of this or similar issues.*

LL. Request for LANDFIRE or others to do research and development on soil and foliar moisture transitions in Black Spruce and implications for FBFMs.

*(LL). This is an intriguing concept that LANDFIRE will evaluate and will coordinate with Joint Fire Science Program (JFSP) on possibilities. There may be an opportunity for a pilot demonstration of this concept in the next year or so provided that sufficient funding and interest is available.*

MM. Request for LANDFIRE or others to do research and development on incorporation of organics into the process of developing FBFMs where this influence changes FBFM from moderate to extreme.

*(MM). This is an intriguing concept (similar to that described in LL – JFSP would be a point of coordination for this type of effort) that LANDFIRE will evaluate. There may be an opportunity for a pilot demonstration of this concept in the next year or so provided that sufficient funding and interest is available.*

NN. Request for LANDFIRE (or other Research and Development) to develop a single go-to data layer that characterizes vegetation disturbances.

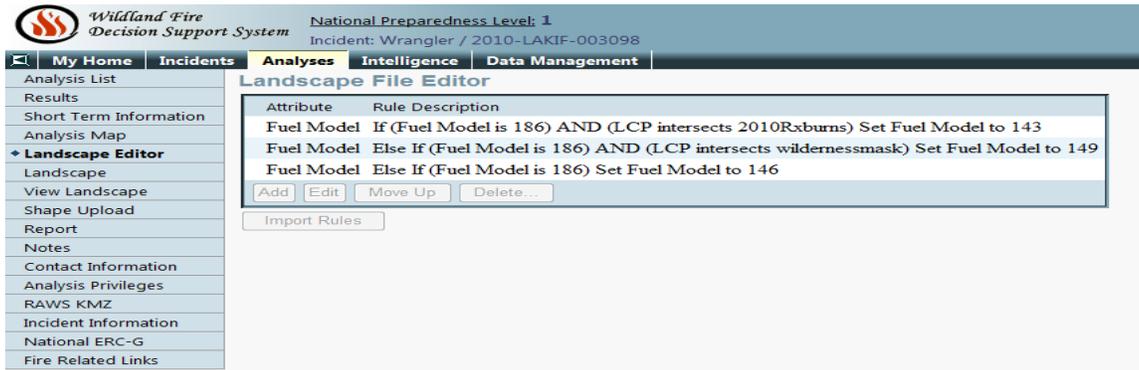
*(NN). LANDFIRE is in the process of assessing the feasibility of this request. LANDFIRE is evaluating: data input availability, scope, schedule, and costs to annually produce and distribute disturbance data. Certainly, the evaluation of results and processes used in the production of LANDFIRE 2008 Refresh (LF\_1.1.0) will help determine the potential of delivering this on a periodic basis. LANDFIRE 2008 Refresh is delivering a set of ten disturbance grids associated with the updating process as well as two different versions of an integration of these disturbance data. These integrated layers may be the “single go-to data layer” that folks are looking for here.*

## **WFDSS use and results of LANDFIRE Conus**

Kim Ernstrom, Tonja Opperman, et. al.

Presentation described how LANDFIRE data are used in WFDSS highlighting the available data layers and discussions on Near Term Fire Behavior, Short-Term Fire Behavior (STFB), Fire Spread

Probability (FSPro) assessments and query of the WFDSS data base on the types of changes that are typically made to LANDFIRE data as shown in figure 16.



(Figure 16). WFDSS example of Landscape file editor changes and rule

- Difficult to identify specific issues/problems with data layers – mostly discovered through individual fire behavior analyses
- A single “go to” Fuel Model layer that is published annually that would include recent disturbances (wildfires, bug kill, treatments etc.) would be the dream
- Impressed with how responsive the LANDFIRE team is with incorporating local input
- Don’t think that inaccurate data at the individual wildfire level makes a big difference in model outputs – can be corrected easily
- Need a “Do Over” with the naming/versioning convention – very confusing

OO. Request for LANDFIRE to develop a single “go to” Fuel Model layer that is published annually that would include recent disturbances (wildfire, bug kill, treatments, etc.).

*(OO). LANDFIRE is in the process of assessing the feasibility of this request which is very similar to and has connections to item (NN). LANDFIRE is evaluating aspects which include: data input availability, scope, schedule, and costs to annually produce and distribute fuel model layers based on recent disturbance data. Certainly, the evaluation of results and processes used in the production of LANDFIRE 2008 Refresh (LF\_1.1.0) will help determine the potential of this annual production. It is important to note that although this may be a possibility there may be the possibility that data would be 2 years out of date when you factor in data submissions/data draws, data production cycle timing, and data delivery.*

PP. Request for LANDFIRE to do a revision of the naming/versioning convention. It is very confusing.

*(PP). It has become apparent over the years that leadership oversight, management direction, or user input has necessitated the need for a versioning construct and although the naming convention may be part of some confusion, a way to distinguish revisions or updates to the data set is needed. As LANDFIRE moves forward with updating products, LANDFIRE will provide the year of the update, i.e. LANDFIRE 2008, LANDFIRE 2010, etc. The versioning aspects of the naming convention, i.e. LF\_1.1.0 will continue to be used but not as a primary label. At a minimum this should help reduce confusion but also provide and allow for potential changes that may occur within the data set due to found issues or Program leadership direction.*

# Fire Regime and Fire Regime Condition Class

Jim Menakis / Jeff Jones / Doug Havlina

QQ. Request that LANDFIRE and others work to rename and characterize FRCC as Vegetation Departure.

*(QQ). LANDFIRE recognizes that the LANDFIRE 2001 National (LFNA) FRCC and Departure layers are actually “vegetation departure” only, and lack fire regime departure information. LANDFIRE fully supports the idea of making that distinction clear to users and leadership in every way possible. In LANDFIRE 2008 Refresh and beyond, if these two layers are only vegetation departure that do not include comprehensive information on fire regime departure, the Program will work with experts and technical managers to pursue name changes, through leadership approval, that reflect the true nature of the information.*

RR. Request that LANDFIRE put together a process to review and update the Vegetation Dynamics Development Tool (VDDT) models by potentially organizing a structured approach by experts and specialists in ecology.

*(RR). LANDFIRE supports the concept of reviewing and revising LANDFIRE 2001 National (LFNA) Reference Condition models to improve their quality and further improve their consistency. In addition, LANDFIRE supports the concept of “updating” reference condition models to represent current conditions, if a standard set of criteria and a standard structure that meets priority partner needs can be identified. Neither tasks are in a current plan for Refresh or periodic updating, and must be fit into the task structure and finances available for these efforts.*

SS. Request for LANDFIRE to standardize Vegetation Dynamics Development Tool (VDDT) models across models possibly through a reduction or combination of models.

*(SS). LANDFIRE supports the concept of further standardizing LFNA Reference Condition models across map zones through a collapsing process if that process is: 1) a national need is established, 2) a consistent, acceptable set of criteria are established that meet a variety of partner needs, and 3) acceptable, broad-based expert support can be identified and involved in the process. This task is not in a current work for Refresh or periodic updating plans, and must be fit into the task structure and finances available in these efforts.*

## Geo-Spatial Technical Group (GTG)

Cameron Tongier, Sean Triplett, & GTG members.

TT. Request for LANDFIRE to support and participate in a common operating platform. Based on Geo-spatial review and National Wildland Fire Enterprise Architecture (NWFEA).

*(TT). LANDFIRE is very supportive of this work and is working to align the program across program areas as part of a National Landscape Conservation Information Framework where nationally consistent data sets are accessed by multiple parties operating at multiple scales to support a wide variety of business needs. Data within the Framework would adhere to national data standards with assigned data stewardship roles. This process would be fully coordinated across the enterprise applications and models that process these data for use in decision making.*